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Specification

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# DESCRIPTION

## SURFACE ACOUSTIC WAVE DEVICE

11-13-07

Technical Field

The present invention relates to surface acoustic wave (SAW) devices used for resonators or band-pass filters and a method for manufacturing the same. More specifically, the present invention relates to a SAW device having a structure in which an insulating layer covers an interdigital transducer (IDT) electrode.

### Background Art

In duplexers (DPX) or radio frequency (RF) filters used in a mobile communication system, a wideband characteristic and a favorable temperature characteristic are required to be satisfied at the same time. SAW devices that have conventionally been used for DPXs or RF filters use a piezoelectric substrate made of  $36^{\circ}$  to  $50^{\circ}$ -rotated Y-cut X-propagating  $\text{LiTaO}_3$ . This piezoelectric substrate has a temperature coefficient of frequency of about  $-40$  to  $-30$  ppm/ $^{\circ}\text{C}$ . As a method for improving the temperature characteristic, a method for forming a  $\text{SiO}_2$  film having a positive temperature coefficient of frequency to cover an IDT electrode on a piezoelectric substrate has been known. Fig. 30 shows an example of a method for manufacturing this type of SAW device.

As shown in Fig. 30(a), a resist pattern 52 is formed on a piezoelectric substrate 51 except a region where an IDT electrode is to be formed. Then, as shown in Fig. 30(b), an electrode film 53 to serve as an IDT electrode is formed over an entire surface. Then, the resist pattern 52 and the metal film on the resist pattern 52 are removed by using a resist removing agent. In this way, an IDT electrode 53A is formed, as shown in Fig. 30(c). Then, as shown in Fig. 30(d), a  $\text{SiO}_2$  film 54 is formed to cover the IDT electrode 53A.

The following Patent Document 1 discloses a method for manufacturing a SAW device including an insulating or semiconducting